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REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)
Box No. I TITLE OF INVENTION
ARTICULATED SUPPORT ASSEMBLY
Box No. II APPLICANT This person is also inventor

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

C.R. Bard, Inc.
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Applicant's registration No. with the Office

State (that is, country) of nationality:
U.S.State (that is, country) of residence:
U.S.

This person is applicant for the purposes of: all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

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This person is:

 applicant only applicant and inventor inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

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U.S.

This person is applicant for the purposes of: all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

 Further applicants and/or (further) inventors are indicated on a continuation sheet.**Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

 agent common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

ROSENTHAL, Lawrence; POKOTILOW, Steven B.; DeCARLO, James J.; SIEGAL, Matthew W.; and SCHAEFFER, David L.;
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24,377; 26,405; 36,120; 32,941; 32,716

Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

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 applicant and inventor
 inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:
U.S.State (that is, country) of residence:
U.S.

This person is applicant for the purposes of: all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

applicant only
 applicant and inventor
 inventor only (If this check-box is marked, do not fill in below.)

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State (that is, country) of nationality:

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This person is:

applicant only
 applicant and inventor
 inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

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This person is applicant for the purposes of: all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

applicant only
 applicant and inventor
 inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

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Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No. V DESIGNATION

The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.

However,

- DE Germany is not designated for any kind of national protection
- KR Republic of Korea is not designated for any kind of national protection
- RU Russian Federation is not designated for any kind of national protection

(The check-boxes above may be used to exclude (irrevocably) the designations concerned in order to avoid the ceasing of the effect, under the national law, of an earlier national application from which priority is claimed. See the Notes to Box No. V as to the consequences of such national law provisions in these and certain other States.)

Box No. VI PRIORITY CLAIM

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application:*	international application: receiving Office
item (1) 30/01/2003	60/443,822	U.S.		
item (2)				
item (3)				

Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (*only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office*) identified above as:

all items item (1) item (2) item (3) other, see Supplemental Box

* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / U.S.

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)

Number

Country (or regional Office)

Box No. VIII DECLARATIONS

The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):

Number of declarations

<input type="checkbox"/>	Box No. VIII (i)	Declaration as to the identity of the inventor
<input type="checkbox"/>	Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent
<input type="checkbox"/>	Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application
<input type="checkbox"/>	Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)
<input type="checkbox"/>	Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty

Box No. IX CHECK LIST; LANGUAGE OF FILING

This international application contains:

(a) in paper form, the following number of sheets:

request (including declaration sheets) :	4
description (excluding sequence listing and/or tables related thereto) :	7
claims :	2
abstract :	1
drawings :	2

Sub-total number of sheets : 16

sequence listing :

tables related thereto :

(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)

Total number of sheets : 16

(b) only in computer readable form (Section 801(a)(i))(i) sequence listing
(ii) tables related thereto(c) also in computer readable form (Section 801(a)(ii))(i) sequence listing
(ii) tables related thereto

Type and number of carriers (diskette, CD-ROM, CD-R or other) on which are contained the

 sequence listing:
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(additional copies to be indicated under items 9(ii) and/or 10(ii), in right column)

This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):

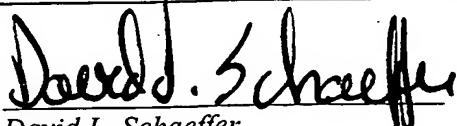
1. <input checked="" type="checkbox"/> fee calculation sheet	: 1
2. <input type="checkbox"/> original separate power of attorney	: .
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4. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any:	: 1
5. <input type="checkbox"/> statement explaining lack of signature	: .
6. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s):	: .
7. <input type="checkbox"/> translation of international application into (language):	: .
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9. <input type="checkbox"/> sequence listing in computer readable form (indicate type and number of carriers)	: .
(i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application)	: .
(ii) <input type="checkbox"/> (only where check-box (b)(i) or (c)(i) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter	: .
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11. <input checked="" type="checkbox"/> other (specify): Certificate of Mailing by "Express Mail"	: 1

Figure of the drawings which should accompany the abstract: 1

Language of filing of the international application:

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

David L. Schaeffer
Reg. No. 32,716

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1. Date of actual receipt of the purported international application:

3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:

4. Date of timely receipt of the required corrections under PCT Article 11(2):

5. International Searching Authority (if two or more are competent): ISA /

2. Drawings:

 received: not received:6. Transmittal of search copy delayed until search fee is paid

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

See Notes to the request form

This sheet is part of and does not count as a sheet of the international application.

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FEE CALCULATION SHEET
Annex to the Request

For receiving Office use only

International Application No.

Applicant's or agent's
file reference

126688/0071

Date stamp of the receiving Office

Applicant
C.R. Bard, Inc.

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE 300.00 T

2. SEARCH FEE 1,000.00 S

International search to be carried out by U.S.

(If two or more International Searching Authorities are competent to carry out the international search, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FILING FEE

Where items (b) and/or (c) of Box No. IX apply, enter Sub-total number of sheets } 16

Where items (b) and (c) of Box No. IX do not apply, enter Total number of sheets }

i1 first 30 sheets 1,035.00 i1

i2 number of sheets
in excess of 30 x fee per sheet = i2

i3 additional component (only if sequence listing and/or tables related thereto are filed in computer readable form under Section 801(a)(i), or both in that form and on paper, under Section 801(a)(ii)):

400 x fee per sheet = i3

Add amounts entered at i1, i2 and i3 and enter total at I 1,035.00 I

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4. FEE FOR PRIORITY DOCUMENT (if applicable) 20.00 P

5. TOTAL FEES PAYABLE 2,355.00

TOTAL

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Authorization to charge the fee for priority document.

Receiving Office: RO/

Deposit Account No.: 19-4709

Date: January 30, 2004

Name: David L. Schaeffer, Reg. No. 31,716

Signature: David L. Schaeffer

TITLE OF THE INVENTION

ARTICULATED SUPPORT ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

[001] This application claims the benefit of U.S. Provisional Patent Application No. 60/443,822, filed on January 30, 2003, the contents of which are incorporated by reference herein.

BACKGROUND OF THE INVENTION

[002] As the medical field further advances, surgical procedures requiring precise positioning of monitoring and surgical tools become necessary. Radiologists perform numerous guided biopsies using ultrasound and computer aided tomography ("CAT") scanning techniques, magnetic resonance imaging techniques and fluoroscopic imaging techniques. Biopsies and other procedures are performed using a variety of needle-like instruments.

[003] For example, one currently widely applied and popular method for the treatment of prostate cancer is brachytherapy, a form of cancer treatment in- which a radioactive energy source is placed into or adjacent to a malignant tumor. Generally, brachytherapy can be divided into two categories: high dose rate (HDR) and low dose rate (LDR). In HDR brachytherapy, a radioactive energy source with high activity is placed into or adjacent to the malignant tumor for a predefined period of time. Conversely, LDR brachytherapy entails the placement of a low activity radioactive energy source into or adjacent to the malignant tumor for an indeterminate period of time.

[004] In LDR brachytherapy, radioactive isotopes are used as the radioactive energy sources. Some of the more common radioactive isotopes used in LDR brachytherapy include

Iodine-125, Palladium-103, Gold-198, Ytterbium-169, and Iridium-192. These isotopes are typically packaged in a housing constructed of a lightweight and durable material, such as titanium, and are commonly referred to as isotope seeds. The dimensions of the isotope seeds can be extremely variable both in diameter and in length. The radioactive isotopes commonly used in LDR brachytherapy are selected for their low energy and relatively short halflife. Low energy sources provide for a limited tissue penetration by the emitted radiation, so that the radiation's effects are limited to the tumor without substantially affecting adjacent normal tissue. A short half-life is advantageous in that the dose of radiation that is delivered depletes in a reasonably short period of time.

[005] The area of therapeutic effect for Iodine-125 and Palladium-103 is limited to a sphere approximately 1 cm in diameter around the isotope seed. As a result, a three dimensional array of isotope seeds is commonly used to treat a tumor. In LDR brachytherapy of prostate cancer, a multitude of isotope seeds is typically used. Since solid tumors, like those found in prostate cancer, are perceived to be diffuse, the entire organ is targeted for therapy.

[006] In order to place isotope seeds into the aforementioned three-dimensional array, needles, using a two-dimensional grid pattern in conjunction with longitudinal spacing, can deliver isotope seeds. The two dimensional grid is frequently defined by a needle guide, called a template. The template is provided with a plurality of holes that provide guidance for the longitudinal progression of the needles, thus insuring their desired two-dimensional position within the tumor. After the two-dimensional needle array is positioned within the tumor, the isotope seeds are deposited along the longitudinal axis of each needle.

[007] Presently, there are many commercially -available devices for holding, manipulating and stabilizing the numerous commercially available needle holders designed for use in brachytherapy procedures. In general, these devices have not overcome the same

basic limitation; they are "post-insertion" probe fixation devices where the probe is first inserted into the body and then affixed to a stand. This necessitates a subsequent reorientation of the probe with regard to the insertion cavity, thereby wasting valuable time in obtaining the desired probe orientation.

[008] In an attempt to remedy these shortcomings, certain pre-insertion fixation devices have been developed. In these devices, the probe is first affixed to a stand. The combination of the fine adjustment mechanism with the probe affixed is then released to the free omni-directional mode to enhance insertion of the probe into the body of the patient. For brachytherapy, for example, the probe is manually inserted into the rectum and, once the desired orientation is achieved, as viewed and confirmed by the monitored ultrasound images, the device is then set in a fixed mode.

[009] Many currently available devices provide movement along several axes, however such movement risks a loss of orientation in other axes during adjustment. Additionally, the fine adjustment of such devices is quite limited. Moreover, such devices are unwieldy and tend to either be heavy and/or broad-based to achieve floor stand based stability or spatially cumbersome table-mounted structures that tend to obstruct the user's movements and patient access. The known stabilizer assemblies, including those used to support devices for brachytherapy, are often difficult to manipulate by the physician, unreliable in operation, and are susceptible to mechanical problems. Furthermore, reliable and convenient locking of the support apparatus in a desired position is frequently challenging, and the range and variety of movement possible for many stabilizers is not satisfactory.

[0010] Thus, there remains a need for a new stabilizer which is reliable and convenient to operate, readily lockable in a desired position, easily attachable to a variety of mounting structures, and in particular is capable of moving smoothly and precisely for improved holding, manipulation and stabilizing devices for use in a variety of procedures. In

addition, there are numerous other medical procedures and non-medical applications where enhanced holding, manipulation and/or stabilizing of devices can be helpful.

SUMMARY OF THE INVENTION

[0011] The present invention eliminates the above-mentioned needs for a protection device by providing an articulated support assembly.

[0012] In accordance with the present invention, there is provided an articulated support assembly comprising a stepping head clamping lock, a lockable support assembly connected to said stepping head clamping lock and selectively releasably connectable to a stationary object for allowing multi-planar orthogonal manipulation of a device into a position with respect a plane of said stationary object, and a plurality of joints connected to said lockable support assembly that allows multi-planar orthogonal movement.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIGURE 1 is a perspective view illustration of the preferred embodiment of the present invention.

[0014] FIGURE 2 is a perspective view illustration of the preferred embodiment of the present invention of FIGURE 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] Referring now to Fig. 1, a preferred embodiment of the present invention is illustrated as articulated support assembly 10. Articulated support assembly 10 includes stepping head clamping lock 12, lockable support assembly 14, and a plurality of joints 16a, 16b, 18a, 18b, 29a, and 29b.

[0016] As illustrated in Fig. 1, stepping head clamping lock 12 secures removable stepping head assembly 20 to lockable support assembly 14. As is shown in Fig. 2, removable stepping head assembly 20 slides into a stepping head clamp 13 in order to be secured in position. Stepping head clamp 13 is connected to lockable support assembly 14, thereby facilitating the engagement of removable stepping head assembly 20 to lockable support assembly 14. Once removable stepping head assembly 20 is placed in the appropriate position, stepping head clamping lock 12 secures the engagement of removable stepping head assembly 20 to lockable support assembly 14.

[0017] Removable stepping head assembly 20 can support a number of devices, including, but not limited to medical devices, such as brachytherapy devices, laser devices, ultrasonic devices, x-ray devices, and lighting devices. In the preferred embodiment of the present invention, medical device 40 is a brachytherapy device for inserting radioactive isotope seeds and non-radioactive spacers via an elongated needle into a patient.

[0018] In order to effectively insert radioactive isotope seeds and non-radioactive spacers through medical device 40, articulated support assembly 10 is preferably selectively releasably connectable to a stationary object for allowing multi-planar orthogonal manipulation of the medical device into a position with respect a plane of the stationary object. The stationary object is preferably a medical table, but other stationary objects, such as walls, floors, ceilings, counters, and the like are contemplated. Lockable support assembly 14 includes at least one clamp 32a or 32b for securing lockable support assembly 14 to the stationary object. Stationary object lock 30 is operated by the user to tighten the secure engagement between lockable support assembly 14 and the stationary object once lockable support assembly 14 is secured to the stationary object (not shown).

[0019] Once lockable support assembly 14 is fully secured to the stationary object, support arms 22a and 22b, which can be formed from the same structure as clamps 32a and

32b, respectively, permit movement through a first plane substantially parallel to a first plane of the stationary object. Support arms 22a and 22b include joint articulation points 16a and 16b. Joint articulation points 16a and 16b allow for arms 24a and 24b to be fitted therein. The connection between joint articulation points 16a and 16b and arms 24a and 24b can form any one of a number of joint arrangements, however, it is preferred that the joint arrangement move within the first plane substantially parallel to the first plane of the stationary object.

[0020] When arms 24a and 24b are in their desired positions, horizontal position locks 28a and 28b are operated by the user to tighten and prevent movement between arms 24a and 24b and joint articulation points 18a and 18b. This will allow articulated support assembly 10 to be held within one position with respect to the first plane substantially parallel to the first plane of the stationary object. Joint articulation points 18a and 18b also permit movement of articulated support assembly 10 within a second plane substantially parallel to a second plane of the stationary object. In the preferred embodiment of the present invention, the second plane is substantially perpendicular to the first plane. For example, if the first plane is the horizontal plane of the stationary object, the second plane is the corresponding substantially perpendicular vertical plane. Arms 27a and 27b engage joint articulation points 18a and 18b and move in directions perpendicular to the directions moved by arms 24a and 24b. Upon being placed in their desired positions, arms 24a and 24b are locked into place by vertical position locks 26a and 26b. Vertical position locks 26a and 26b are operated by the user to tighten and prevent movement between arms 27a and 27b and lockable support assembly 14. This will allow lockable support assembly 14 to be held within one position with respect to the second plane substantially parallel to the second plane of the stationary object and substantially perpendicular to the first plane of the stationary object.

[0021] Lockable support assembly 14 can then be secured in position by tightening joint articulation points 29a and 29b. The tightening of joint articulation points 29a and 29b is

accomplished by engaging assembly lock 25, thus preventing any undesired movement by lockable support assembly 14. Removable stepping head assembly 20 can be finely adjusted for positioning of device 38 fine adjustment assembly 34. Moreover, the pitch of removable stepping head assembly 20, and therefore device 38, can be adjusted as well. Once the desired pitch of removable stepping head assembly 20 is located, the user can then engage pitch lock 36 to prevent movement of removable stepping head assembly 20 from the desired pitch.

[0022] Although only a few exemplary embodiments of the present invention have been described in detail above, those skilled in the art will readily appreciate that numerous modifications are to the exemplary embodiments are possible without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the following numbered paragraphs.

CLAIMS

What is claimed is:

1. An articulated support assembly comprising: a stepping head clamping lock;

a lockable support assembly connected to said stepping head clamping lock and selectively releasably connectable to a stationary object for allowing multi-planar orthogonal manipulation of a device into a position with respect a plane of said stationary object; and

a plurality of joints connected to said lockable support assembly that allows multi-planar orthogonal movement.

2. The assembly according to paragraph 1 further comprising a removable stepping head assembly.

3. The assembly according to paragraph 1 wherein said lockable support assembly includes at least one support arm.

4. The assembly according to paragraph 3 wherein said at least one support arm is connected to a joint of said plurality of joints.

5. The assembly according to paragraph 4 wherein said at least one support arm includes at least one position lock.

6. The assembly according to paragraph 5 wherein said at least one position lock prevents vertical movement when engaged.

7. The assembly according to paragraph 5 wherein said at least one position lock prevents horizontal movement when engaged.

8. The assembly according to paragraph 5 wherein said at least one position lock prevents movement of when engaged.

9. The assembly according to paragraph 4 wherein said at least one support arm includes at least one stationary object lock.

10. The assembly according to paragraph 9 wherein said at least one stationary object lock is a clamp lock.

11. The assembly according to paragraph 2 wherein said removable stepping head assembly further comprises a fine adjustment assembly.

12. The assembly according to paragraph 2 wherein said removable stepping head assembly further comprises-a pitch lock.

13. The assembly according to paragraph 2 wherein said removable stepping head assembly receives said device.

14. The assembly according to paragraph 13 wherein said device is a medical device.

ABSTRACT

An articulated support assembly has : a stepping head clamping lock, a lockable support assembly connected to the stepping head clamping lock and selectively releasably connectable to a stationary object for allowing multi-planar orthogonal manipulation of a device into a position with respect a plane of the stationary object, and plural joints connected to the lockable support assembly that allows multi-planar orthogonal movement.

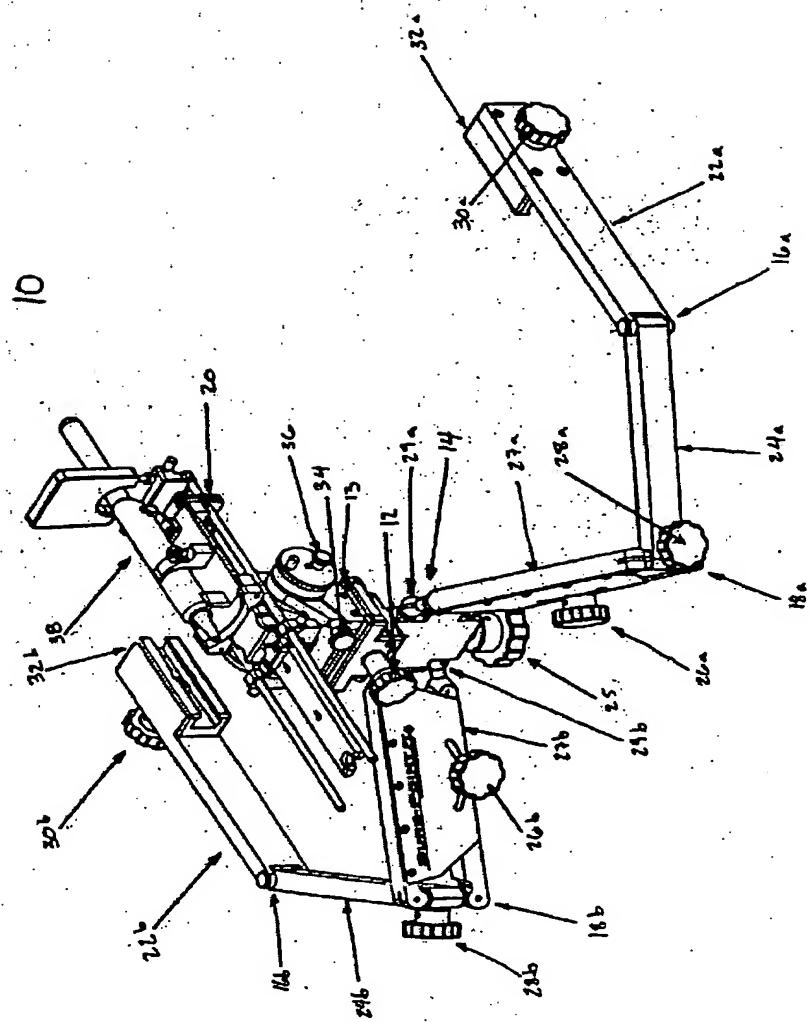


FIGURE 1

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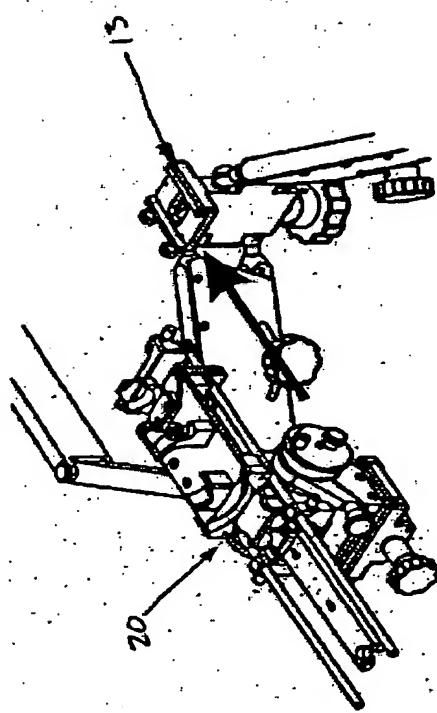


FIGURE 2

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PCT

GENERAL POWER OF ATTORNEY

(for several international applications filed under the Patent Cooperation Treaty)

(PCT Rule 90.5)

The undersigned person(s)

(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

C.R. Bard, Inc.
730 Central Avenue
Murray Hill, New Jersey 07974
United States

hereby appoints (appoint) the following person as: agent common representative

Name and address

(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Rosenthal, Lawrence, Reg. No. 24,377; Pokotilow, Steven B., Reg. No. 26,405; DeCarlo, James J., Reg. No. 36,120; Siegal, Matthew W., Reg. No. 32,941; and Schaeffer, David L., Reg. No. 32,716, of
STROOCK & STROOCK & LAVAN LLP
180 Maiden Lane
New York, New York 10038
United States

To represent the undersigned before

all the competent International Authorities
 the International Searching Authority only
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in connection with any and all international applications filed by the undersigned with the following Office

The United States Patent and Trademark Office

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and to make or receive payments on behalf of the undersigned.

Signatures of the applicant(s) (where there are several persons, each of them must sign; next to each signature, indicate the name of the person signing and the capacity in which the person signs, if such capacity is not obvious from reading this power):

C.R. Bard, Inc.

By (signature of officer or authorized employee)

Name: Nadia J. Bernstein

Title: Vice-President

Date: AUGUST 1, 2003

Form PCT/Model of general power of attorney (for several international applications)(July 1992)

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